

What is claimed is:

1. An alternator for use in a vehicle, comprising:

a stator having a stator core being formed in a cylindrical shape and a stator coil wound around said stator core;

5 a rotor having pole cores and an excitation coil, being attached on a rotation shaft, so as to be located within said stator;

brackets, being thermally connected to said stator for supporting said stator, for supporting said rotation shaft at both sides of said rotor, and being closed at one side of said rotor;

10 cooling liquid passages provided in said brackets;

a cooling fan provided at the closing side of said rotor; and

a cooling fin provided in vicinity of said cooling passages, opposing to said cooling fan.

15 2. An alternator for use in a vehicle, as defined in the claim 1, wherein said cooling fan is of a centrifugal type, having plural numbers of blades extending in radial directions, so as to emit an air sucked from a central portion from an outer peripheral portion thereof, and said cooling fin has plural numbers of fin
20 portions extending in radial directions, so as to form return passages for guiding the air emitted from said cooling fan from the outer peripheral portion to the central portion.

3. An alternator for use in a vehicle, as defined in the claim 2, wherein the fin portion of said cooling fin is inclined
25 in a direction of an angle of flow out from said cooling fan in an outer peripheral portion thereof, while an inner peripheral portion being directed into a central direction thereof.

4. An alternator for use in a vehicle, as defined in the

claim 2, further comprising a fin guide for partitioning between said cooling fin and said cooling fan, being thermally connected with said cooling fin.

5 5. An alternator for use in a vehicle, as defined in the claim 1, wherein said bracket is formed from aluminum die-cast, and with said bracket is formed said cooling fin in one body.

10 6. An alternator for use in a vehicle, as defined in the claim 1, wherein said cooling fan is made of material having good heat conductivity, and in thermally contact with end surface of the pole cores of said rotor over entire periphery thereof.

7. An alternator for use in a vehicle, comprising:

a stator having a stator core being formed in a cylindrical shape and a stator coil wound around said stator core;

15 a rotor having pole cores and an excitation coil, being attached on a rotation shaft, so as to be located within said stator;

brackets, being thermally connected to an outer periphery of said stator for supporting said stator, for supporting said rotation shaft at both sides of said rotor, and being closed at one side of said rotor;

20 an electric appliance disposed on a side of a side surface portion of said bracket for supporting said stator, being opposite to the rotor;

25 cooling liquid passages having an outer peripheral cooling liquid passage formed on an outer peripheral portion of said bracket for supporting said stator, and a side surface cooling liquid passage formed on the side surface portion of said bracket closing at the one side of said rotor;

a cooling fan provided at the closed side of said rotor;
and

a cooling fin provided in vicinity of said side surface cooling passage, opposing to said cooling fan.

8. An alternator for use in a vehicle, as defined in the claim 7, wherein said cooling fan is of a centrifugal type, having plural numbers of blades extending in radial directions, so as to emit an air sucked from a central portion from an outer peripheral portion thereof, and said cooling fin has plural numbers of fin portions extending in radial directions, so as to form return passages for guiding the air emitted from said cooling fan from the outer peripheral portion to the central portion.

9. An alternator for use in a vehicle, as defined in the claim 7, wherein said bracket has both side surface portions for closing down at both sides of said rotor, and said cooling fans are provided at the both sides of said rotor, respectively.

10. An alternator for use in a vehicle, as defined in the claim 7, wherein said bracket has a side surface portion for opening the other side of said rotor, and said cooling fan also includes a cooling fan for passing through an air outside at the other side of said rotor.

11. An alternator for use in a vehicle, comprising:

a rotation shaft, on which rotating power is transmitted from an engine of a vehicle through a pulley;

a rotor fixed onto said rotation shaft, to be excited by an excitation coil;

a stator provided in an outer periphery of the rotor, being wound around with a stator coil;

a front bracket for supporting the stator in a direction of said rotor shaft from a side of the pulley, and for supporting said rotation shaft through a shaft bearing; and

a rear bracket for supporting said stator from an opposing

side of said pulley, and for supporting said rotation shaft through a shaft bearing, wherein either one of said front bracket and said rear bracket comprises:

a cooling liquid passage extending on periphery thereof;

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coupler member attachment portions, being formed in condition of being closed at plural number of positions around an outer periphery portion thereof, locating in an outside of said cooling liquid passage.

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12. An alternator for use in a vehicle, as defined in the claim 11, wherein said cooling liquid passage and said coupler member attachment portions are provided on each of said front bracket and said rear bracket, and one of said respective coupler member attachment portions is opened, so that a coupler member is attached to communicate between the cooling liquid passage of said front bracket and the cooling liquid passage of said rear bracket through the opening portion thereof.

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13. An alternator for use in a vehicle, one of the coupler member attachment portions of said front bracket or said rear bracket, having the cooling liquid passage therein, is opened, and a water supply/discharge member having a water supply opening and a water discharge opening is attached at the opening portion opened.

14. An alternator for use in a vehicle, comprising:

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a rotation shaft, on which rotating power is transmitted from an engine of a vehicle through a pulley;

a rotor fixed onto said rotation shaft, to be excited by an excitation coil;

a stator provided in an outer periphery of the rotor, being wound around with a stator coil;

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a front bracket for supporting the stator in a direction of said rotor shaft from a side of the pulley, and for supporting said rotation shaft through a shaft bearing, being formed with a cooling liquid passage therein;

5 a rear bracket for supporting said stator from an opposing side of said pulley, and for supporting said rotation shaft through a shaft bearing, being formed with a cooling liquid passage therein; and

10 a coupler member for communicating between the cooling liquid passage of said front bracket and the cooling liquid passage of said rear bracket, wherein:

15 said front bracket and said rear bracket are formed to extend said cooling liquid passages along periphery thereof, and are formed with coupler member attachment portions in condition of being closed, at plural numbers of positions on an outer periphery portion, located in an outside of said cooling liquid passage; and

20 said coupler member communicates between the cooling liquid passage of said front bracket and the cooling liquid passage of said rear bracket through an opening opened at one of said coupler member attachment portions, bringing said cooling liquid passages at a side having a water supply/discharge opening into two systems, and connects the cooling liquid passage of the other side between those two systems of the cooling liquid passages, thereby bringing
25 the cooling liquid system as a whole to be conducted in series.

15. An alternator for use in an automobile, as defined in the claim 14, wherein said coupler members shut off the respective cooling liquid passages at the opening portions, and a cooling liquid partitioning portion is provided for separating the
30 conduction passage into passages to go and come back.